

MACACA NEMESTRINA Projects as at October 2018

Spatial and temporal use of oil palm plantations by wild *Macaca nemestrina* and its implication for mitigating human-wildlife conflicts

Funded by The Rufford Foundation (1st RSG)

All Malaysian primates face severe threats by deforestation of which the most imminent one is the loss of habitat itself. Secondary threats arise when wildlife "invades" close by agricultural lands in search of food and conflicts between farmers and wildlife have become frequent. In rural areas, primates can frequently be observed feeding on oil palm fruits and are hunted by plantation owners, including the use of rifles, air-guns, fire-crackers or live-traps. When farmers approach a group of macaques that forages in their plantation the animals would usually allow little time for observation but flee very quickly back into the forest. Thus, farmers are left with the impression that macaques raided their crops. By studying a habituated group of free-ranging southern pig-tailed macaques (*Macaca nemestrina*), the spatial and temporal use of plantation vs. forest shall be assessed. The group inhabits a primary forest reserve adjacent to oil palm plantations and can be observed foraging in the plantation on a daily basis.

A detailed survey on the utilization mode and amount of ingested oil palm fruit shall allow the assessment of the actual negative impact of these primate species on the total monthly harvest. Preliminary studies showed that, although pigtailed macaques frequently use plantations to forage, they only handle a small amount of ripe, and therefore valuable, oil palm fruits. During their daily plantation visits, some group members feed on oil palm fruits, while others pick through soil matters in search for arthropods or chew on other plant material, or simply sit around and follow social activities. The impression by farmers that macaques "raid" their crops might thus be subjective and to certain extent exaggerated. Small overabundant rodents that usually eat away at oil palm fruits might have a considerably higher impact. As I predict a relatively minor impact of pig-tailed macaques on the monetary loss of the monthly oil palm harvest, the results of this study shall be used to raise awareness amongst local farmers and plantation owners not to harm the macaques.

Pigtailed macaques in oil palm plantations - pest or pest control?

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Macaca nemestrina is considered a pest in agricultural crops, including oil palm. However, during a one year study we found that although they do feed on oil palm fruits, their impact on the harvest is rather negligible. Additionally, they actively hunt for rats, which are considered the major pest in oil palm. A preliminary assessment of rat abundances at the plantations revealed that *Rattus argentiventer* and *R. rattus* were highly diminished within the macaques' home range, whereas abundance was high outside their home range. Thus, macaques may act as biological pest control in oil palm plantations fringing their forest habitat.

By shifting the common perception of *Macaca nemestrina* as pest to biological pest control, we will not only work toward the conservation of this species in the wild but also give oil palm growers an additional tool in biological pest management, adding a diurnal predator to the two existing nocturnal predators mentioned above. By allowing macaques to naturally forage in their plantations, the monetary and environmental costs of applying poisons would be significantly reduced.

In this project I will assess the impact of macaques on rat population abundance by conducting an extensive mark and recapture study of plantation rats within and outside the Pigtail home range, conduct targeted focal animal observations to assess the rat feeding behaviour of the macaques and reach out to national oil palm growers through workshops and awareness campaigns on biological pest control for oil palm companies and small holders and the community.

The impact of oil palm plantations on genetic diversity and behaviour of wild Southern Pigtailed macaques (*Macaca nemestrina*) in Peninsular Malaysia

- PhD project Anna Holzner, since 2017
- Supervisor Prof. Anja Widdig, UL
- Co-supervisor Dr. Nadine Ruppert, USM

The extensive conversion of tropical forest into oil palm plantation represents a major threat for many primate species in Southeast Asia. Malaysia is a biodiversity hotspot with high primate diversity but still loses large parts of its natural habitat to new oil palm plantations. Pig-tail macaques (*Macaca nemestrina*, IUCN: vulnerable), a common yet understudied local primate species, are directly affected by this conversion and widely regarded as pest to oil palm crops. It is yet poorly understood in how far primates can cope in this landscape matrix. Therefore, the aim of his study is 1) to assess genetic diversity across wild pig-tail macaque populations in Malaysia, 2) to investigate how the conversion of primary tropical forest into oil palm plantation impacts on and modifies the feeding and social behaviour of pig-tail macaques and 3) to explore the effects of pig-tail macaques on plantation pest rodents. The first part will be conducted on several populations of pig-tail macaques across Peninsular Malaysia, using STRs in order to assess genetic diversity. The second and third part of the study will be conducted on two groups of wild, habituated pig-tail macaques of one population which regularly visits oil palm plantations. We will combine GPS and observational data to investigate foraging patterns, food composition and intake and social interactions. Since macaques were frequently observed hunting rats in oil palm plantations, a possible pest control effect will be assessed by an extensive mark and recapture programme of plantation rats. This study will be the first to assess genetic diversity in pig-tail macaques and address the role of behavioural plasticity for adapting to and coping with oil palm plantations in primates – a topic particularly important for the protection of a so far barely studied Malaysian primate species. Results of this study can inform community-based conservation management plans and raise awareness amongst farmers to mitigate human-wildlife conflicts.

The function of *Macaca nemestrina* as seed disperser in facilitating forest regeneration

Funded by USM-Short Term Grant

- Proposed PhD project Giovanni Villa, 2017
- Supervisor: Dr Nadine Ruppert, USM
- Co-supervisor Dr Asyraf Mansor, USM

Mother-infant interactions in a free-ranging population of pigtail macaques *Macaca nemestrina*

- Master project Emily Dura 2016/17
- Supervisor Prof Dr. Lori Sheeran, CWU
- Co-supervisor Dr Nadine Ruppert, USM